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Survey Paper on IoT based Home Automation and Energy Awareness System

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Abstract: ***We are developing a home automation system that allows multiple users to handle the device located at home or in any infrastructure through android application and from remote position. The system has main three part those are mobile application to send communication to hardware, second is server which stores data related to user that can be user id, password, username, mail address of user, which also maintains the update of messages those are sent to hardware, third one is Arduino MEGA kit positioned at home or any infrastructure which actually controls appliances. Generally, when we go out of the house or any infrastructure we switch off the light or the electrical devices to avoid such as short circuit, firing etc. but sometimes we forgot to switch off, so to do this we have to come back. So to prevent such situation the recent new technology growing worldwide is the smart home system which manage residence appliances.In smart home system all electrical appliances in home automated with the help of highly developed technology. Smart home expertise provides ease in accessing appliances and also provides safety measures and safety.***

Index Terms–Energy Efficiency, Remote Access , Smart home, Smart Phone, Android Application.

I. INTRODUCTION

Android based home mechanization system that allows one or other user to control the appliance by an Android application or through a website is accessible. The system mainly consist three hardware components:

A. Local device to transport signals to home appliance.
B. A web server to stock up consumer report.
C. Support services to the other mechanism, and a mobile smart device managing Android application.

Distributed cloud platform and services of Google are used to communication between the apparatus. In this System the user will communicate with the remote appliances using Smartphone over long distance. Home automation aim to offer users to organize the remote area appliances through smart phone.

II. LITERATURE SURVEY

In paper “1” , developed system to allow client to access remote appliances and their power utilization. It Uses low power zigbee expertise[1].In this user was able to control appliances, light through mobile unto 10 to 1000 metres .It uses CoZNET zigbee based technology. It present the user details about energy consumption in terms of watts to user to make user attentive about energy consumption of each appliances In this method user not able to control the appliance and luminosity through remote region which is located beyond 100metre. It shows pointless details to user such as the electricity consumption in watt as its going to be difficult for user to understand it[1].

In paper "2"The main intention of this system was to save redundant wastage of energy for that this system uses PIR sensros to check human occurrence and accordingly set the light and fan ON/OFF[2].Mobility and remote effecting of user commands is done using android mobile app which is used to transmit the command to microcontroller through bluetooth.The Main idea of this system to allow user automatic and manual control to electrical appliances.

The main disadvantages of this system is scope ,as PIR sensors are used in classroom,adn range of PIR sensors is less so sometimes it gives mistaken output.This system fails if more than two people enter in th class at the same time.

In paper "3" The built system main goals to provide the user real time energy consumption of each and every electrical appliance[3].For this it uses the smart meter which is connected to the appliances.This smart meter measure the energy consumption of each appliances and accordingly upload data to database using PHP.The main of system was to make user aware about the energy consuption by appliances so that user will take major actions to prevent unnecessary electricity consuption.User can access this all

data through the mobile android application. The main disadvantage of this system is it provide unwanted information to user like energy consumption in units and watts ,instead of showing the consumption in easy format.So due to this the database size increase.
In paper "4" Operation Intervals Based on Real Time Electricity Cost. The system uses data collected by actuators that of power consumption per hour of all devices and analyses them to determine time intervals of their operations[4].It uses various sensors and actuating subsystems. Even though the processing speed has increased there is no significant difference in energy consumption.
In paper "5" the system allow user to control the appliances through samrt phone using internet and android application.It provide the live video and audio streaming.The quality of video and audio provided by the system is good[5].Cost required to develop this system is minimum as compared to other system, but the more complex as compared to other system .To control the appliances it uses actuators. In paper "6" the proposed system uses various sensing elements like PIR,temperature,humidity etc.The data collected from the sensors is used to manage the appliances more efficiently.The main purpose of system is to allow user to access and schedule the remote appliances using internet through mobile phone. For controlling appliances this system uses Wi-Fi connection and cloud platform for data analysis purpose. Many sensors are used for sensing environment conditions and transmitting data to gateway through Wi-Fi[6].Disadvantages of this system Verbose data due to protocol overheads increase the power consumed by the device and make it less efficient. In paper "7" the system allow multiple access to user.The multiple user can access the system at the same time.Old system mainly allow single user only to control the system.Dur to which the whole control is in one hand.So this system is built,which enhances the efficiency of existing system by allowing multiple access. Algorithms proposed for both single and multiple users is very effective. Both monetary costs and execution time for scheduling of appliances is reduced compared to other systems.If one user set the particular appliance to putricular program then ,this schedule will reflect in the all remaining users[7].But the system is more complex. Complexity of algorithms is high in case of implementation.
In paper "8" The elevated energy consuming appliances like electrical devices and communication equipment's and AC system heat and cool, makes our home one among the leading essential areas for the impact of power consumption on likely surroundings. AIM for the preparation of a system which will minimize energy waste in home environments with efficiency supervision devices operation modes[8]. In this design our aim is to use a wireless sensing element set of connections which will observe physical parameter like light-weight and temperature ,because the occurrence of users response and in every of its rooms. In order to optimize energy expenditure and value while guaranteeing the specified comfort level. When users alter their work style this result to unpredictable events, the system is able to observe this mistaken insights by analyzing in real time information from sensors and to switch system behaviour accordingly [8]. Results that might reduce the occurrence of home automation systems for energy saving into the huge market area. In paper "9" ,In modern years, the number of network enable digital devices at home has been escalating fast. With the rapid spreading out of the Internet, the users are request for remote control and monitor of these remote home appliances. Due to this all networking of these appliances to form a kind of home automation system. This method allow an Android base home automation system which allows numerous users to control the appliances by an Android application or through a website . This method mainly consist three hardware workings: a local device like smart phone to transport signals to home appliances, a web server to stock up customer records and sustain services to the other components, and a mobile smart device running Android application[9]. Distributed cloud and services of Google are used to provide platform for messaging stuck between the components. The expansion of system is evaluated based on the criteria considered after the requirement analysis for an adequate home automation system. In paper "10", Internet of Things (IoT) in which all entities existed in enviroment can associated to each other. IoT exposure is very wide and includes variety of objects like smart phones, tablets, digital cameras and sensors. This all devices speak with each other to enhance the user experience and to fulfil their needs implicitly, environment and health. Such. This interrelated devices generates large amount of data. Cloud computing is one of replica to provide on demand access to a mutual pool of free resources like computer, networks, servers, storage, applications, services, and software that can be categorized as infrastructures, software and applications. This Cloud platform help to join to the entities around us so that user can access anything at any time and any place in a user friendly approach using their own portals and in built applications. Hence, cloud acts as a frontend to contact IoT. Applications communicates with devices like sensors which requisite massive storage to store big data, huge computation power to enable the real time processing of the data, in order and high speed network to stream audio or video[10]. This system mainly consist IOT and Cloud computing technology work jointly to manage the complex and large Data problems. This system implements about sense as a check on cloud using applications like AR(Augmented Reality), Agriculture, Environment monitoring, etc. So this system provide sense as overhaul on cloud. In paper "11" ,The word computerization is automatic control of operating devices with negligible or compact human efforts. Wireless technology is upward everywhere. In todays world wireless technology playing most chief role in the automation. It means automation makes technology which exertion without human contact and decision. Home automation is one of the technology budding everywhere in human being life. To pick

up efficiency and performance, operating cost is condensed by low cost communication technology like Bluetooth, Wi-Fi. Bluetooth is wireless technology which is worn in home automation. It is low equipped Cost technique, mostly used and functioning in range up to 100 meters. Bluetooth which is mainly used for data exchange, add new features to smartphones [11].By android application we are able to unite and control household appliances and provide security to handicapped, old people. The idea of paper is to control home appliances like lights, fan. It also provides home security and urgent situation alerts to be activated. It is possible to save energy by auto off lights at night time. Smoke detector can detect smoke or gas leak situation, causing alerts to user on their smartphone[11]. Our residence automation mechanism smartly by providing increased value of time, and comfort to users In paper "12",With the escalating development of modern technology and Smartphone, smart way of living has turned out to be a key part in the nearby era of human life. Due to hasty growth in Technology, Bluetooth has brought a radical change. Bluetooth technology, which aims to trade data wirelessly within a range of short distance by providing a necessary policy to create handiness and controllability. Being wireless, it has wide range of applications[12]. In this paper we presented one of its day to day application i.e.., Home automation, which is forbidden by using Android Smart Phone. A Bluetooth module (HC-05) is used to control the home appliances that are associated to FPGA board. The home appliances that we need to control are connected to the Input / Output ports of the FPGA board and Communication is established linking the FPGA board and Bluetooth device by means of Serial Communication. Home automation not only helps to diminish human efforts but is also force efficient and point in time saving[12]. The main goal of home automation is to help handicapped and old elderly people that will enable them to control home appliance and alert them in some Immediate situations.

III. FUTURE WORK

In opportunity the system will allow user to right to use and schedule the appliances in both mode manual and automatic. Android application will permit user to control this all activity. It will provide user the expenditure in the expenses instead of showing it in watts and unit. This system will offer the security to the user by setting the secure mode ON.In future work system will use the PIR sensor for detecting presence of human instead of camera, so it will reduce excess data accumulation, hence diminish complexity. In future work we will allow user to control the all home appliances based on the gesticulate .User will be able to control lights and fan by gesture which will help to reduce use of phone.

IV. CONCLUSION

In above mentioned system's allows either manual or automatic access of appliances. Sometimes consumer forget to switch o light and this may lead to unnecessary wastage of energy. So the system help user to reduce their consumption by automation in light and appliances.

1) The system allow user to manage their remote area appliances using android phone through network. It automate lights and fan based on weather condition and external luminance. It provide electricity consumption of their appliances and other electrical equipment to user which help user to get aware about their electricity consumption and to manage them accordingly.

2) The system consist of three hardware components: User local device like smart phone,pc to transfer signals to home appliances using internet, a web server store customer records like(password,username,other all data) and support services to the other components, and a mobile device running Android application.

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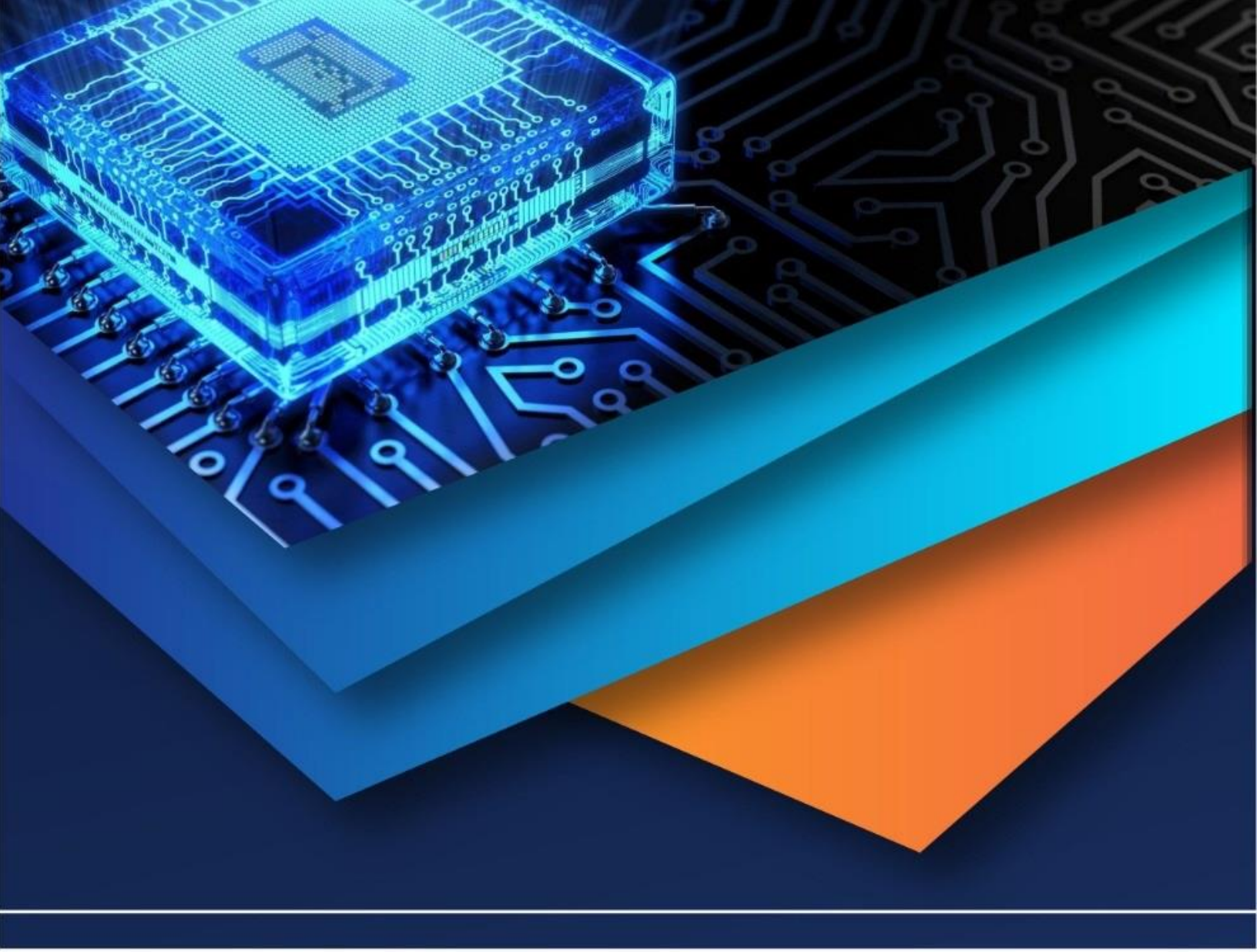

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